Spike samples are used to answer questions such as "What loss or gain of target analytes occurred because of water-matrix characteristics; the field processing, shipping, or handling procedures used; holding time; or laboratory analytical procedures?"

Typically, spikes are applied to samples to be analyzed for concentrations of organic compounds. A sample is spiked by adding a mixture of target compounds obtained from the laboratory to an environmental sample after the sample has been processed. **An unspiked environmental sample must accompany each spiked sample.**

Training is required before personnel attempt to spike samples. The spike kits provided to USGS personnel by the NWQL include the spike solution, equipment, and bottle labels, and detailed instructions.

The numbers and types of matrix spikes used depend on the objectives and data-quality requirements of individual studies, as determined by the project chiefs. Although analyses for a set of spike samples—laboratory spike, field spike, and field-spike replicate—provides the most complete information relating to the performance of the analytical method, the data from only laboratory spikes, or perhaps only one field spike, could be sufficient to meet study needs.

When preparing field-spiked samples for pesticides or VOCs, follow the procedure listed below:

1. Keep samples chilled until spiking. Label bottles appropriately.
2. Wearing gloves, spike each of the QC samples with the appropriate volume of the correct NWQL-provided spike solution:
   - Check that the pesticide samples are being spiked with pesticide-spike solution.
   - Check that the VOC samples are being spiked with VOC-spike solution.
3. Chill field-spiked samples to 4 °C or below without freezing, and handle in a manner identical to that of the environmental sample.
4. Record the following information related to the spike sample on field and NWQL Analytical Services Request forms:

   Lot number of spike solution, volume of spike solution, and source of spike solution.